

A' 52. (New) A gamma detector, comprising:

a radiation sensing element, wherein said radiation sensing element transforms radiation into light;

a light receiving element, wherein said light receiving element transforms light into electrical impulses;

a housing encasing said radiation sensing element and said light receiving element; and

at least one window in said housing for allowing radiation into the detector, wherein said window is formed of a material comprising polyether ether ketone.

53. (New) The gamma detector of claim 52, wherein said radiation sensing element comprises a scintillation element.

54. (New) The gamma detector of claim 53, wherein said scintillation element comprises sodium iodide.

55. (New) The gamma detector of claim 53, further comprising a reflector wrapped around said scintillation element.

56. (New) The gamma detector of claim 55, further comprising an alumina powder between said reflector and said scintillation element.

57. (New) The gamma detector of claim 55, wherein said reflector comprises polytetrafluorethylene.

58. (New) The gamma detector of claim 55, further comprising a polyimide wrap surrounding said reflector.

59. (New) The gamma detector of claim 58, further comprising a polyimide tape for holding said polyimide wrap in place.

60. (New) The gamma detector of claim 59, further comprising a lubricant between said polyimide tape and said flexible support sleeve.

61. (New) The gamma detector of claim 53, further comprising a shield within said housing and encompassing said scintillation element.

62. (New) The gamma detector of claim 61, further comprising a flexible support sleeve at least partially surrounding said scintillation element within said shield, said flexible support sleeve providing dynamic support for said scintillation element.

63. (New) The gamma detector of claim 62, wherein said flexible support sleeve comprises a material transparent to gamma radiation.

64. (New) The gamma detector of claim 63, wherein said flexible support sleeve comprises stainless steel.

65. (New) The gamma detector of claim 62, wherein said flexible support sleeve includes bends and flat portions, said flat portions contacting said scintillation element and said bends contacting said shield.

66. (New) The gamma detector of claim 65, wherein said bends promote friction between said shield and said flexible support sleeve and suppress relative movement between said shield and said flexible support sleeve.

67. (New) The gamma detector of claim 65, wherein said flat portions include a coating on a surface facing said scintillation element.

68. (New) The gamma detector of claim 67, wherein said coating comprises a dry lubricant.

69. (New) The gamma detector of claim 61, wherein said shield includes a plurality of stiffening rings.

70. (New) The gamma detector of claim 61, further comprising:

a rigid dynamic enclosure encompassing said shield; and

a second flexible support sleeve at least partially surrounding said shield within said rigid dynamic enclosure.

71. (New) The gamma detector of claim 70, wherein said flexible support sleeves each partially extend circumferentially around said scintillation element leaving a gap between said scintillation element and said rigid dynamic enclosure to allow entry of radiation.

72. (New) The gamma detector of claim 71, wherein said rigid dynamic enclosure includes an opening and wherein said opening is aligned with and has at least as large a circumferential extent as said gap.

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73. (New) The gamma detector of claim 72, wherein said enclosure includes a plurality of rings and fingers, said rings completely extending across said opening and said fingers partially extending across said opening.

74. (New) The gamma detector of claim 52, wherein said light receiving element comprises a photomultiplier tube.

75. (New) The gamma detector of claim 74, wherein said photomultiplier tube includes a faceplate and a photo-cathode.

76. (New) The gamma detector of claim 74, further comprising an explosion-proof housing within said housing and encasing said photomultiplier tube.

77. (New) The gamma detector of claim 52, further comprising an optical coupler optically coupled to a first end of said scintillation element.

78. (new) The gamma detector of claim 77, further comprising an axial spring positioned at a second end of said scintillation element to bias said scintillation element toward said optical coupler.

79. (New) The gamma detector of claim 78, wherein said light receiving element comprises a photomultiplier tube, further comprising:

a window positioned between said photomultiplier tube and said scintillation element; and

a second flexible support sleeve surrounding said photomultiplier tube within

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~~said module housing, said second flexible support sleeve providing dynamic support for said photomultiplier tube.~~

80. (New) The gamma detector of claim 79, wherein said photomultiplier tube includes a faceplate and a photo-cathode.

81. (New) The gamma detector of claim 79, further comprising:
an explosion-proof housing surrounding said module housing; and
a third flexible support sleeve surrounding said module housing within said explosion-proof housing, said third flexible support sleeve providing dynamic support for said photomultiplier tube.

82. (New) The gamma detector of claim 81, further comprising:
a rigid dynamic enclosure encompassing said shield and said explosion-proof housing; and
a fourth flexible support sleeve surrounding said explosion-proof housing within said rigid dynamic enclosure, said fourth flexible support sleeve providing dynamic support for said photomultiplier tube.

83. (New) The gamma detector of claim 52, wherein said material forming said window is a multi-layer woven carbon-fiber matrix impregnated with polyether ether ketone.

84. (New) The gamma detector of claim 83, wherein said carbon fiber matrix makes up about sixty percent by volume of said material forming said window.

85. (New) The gamma detector of claim 52, wherein said housing comprises an armor material positioned to protect said gamma detector from flying debris.

86. (New) The gamma detector of claim 85, further comprising a spray mechanism.

87. (New) The gamma detector of claim 86, wherein said spray mechanism is integral with said armor.

88. (New) The gamma detector of claim 86, wherein said spray mechanism is attached to said armor.

89. (New) The gamma detector system of claim 86, wherein said spray mechanism comprises a sprayer in fluid connection with a spray line.

90. (New) The gamma detector system of claim 89, wherein said spray line is connected to said sprayer by a spray channel.